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Emotional maltreatment and disordered eating in adolescents:

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Abstract

The present study aimed to determine if emotion regulation mediates the relationship between emotional maltreatment and disordered eating behavior in adolescents. Participants were 222 secondary school pupils (aged 14-18 years) from a state high school in the UK. Standardized questionnaire measures were used to gather self-report data on emotional abuse and emotional neglect, functional and dysfunctional emotion regulation strategies and disordered eating behavior. Results showed that disordered eating was associated with emotional abuse, dysfunctional emotion regulation and being female. Multiple mediation analysis found an indirect relationship between emotional abuse and disordered eating through dysfunctional emotion regulation. Interestingly, emotional neglect predicted lower levels of functional emotion regulation. The findings support previous research showing emotion regulation to mediate the relationship between childhood abuse and disordered eating in adults and a differential effect of abuse and neglect on emotion regulation. Longitudinal studies are required to confirm the direction of relationships; however these data suggest that dysfunctional emotion regulation is a significant variable in the development of disordered eating and may be a useful target for intervention.

Keywords

Disordered eating, emotional maltreatment, emotional abuse, emotional neglect, emotion regulation, adolescents

Childhood maltreatment is a term encompassing different forms of abuse and neglect, including physical abuse, physical neglect, sexual abuse, emotional abuse and emotional neglect. Disordered eating behavior has been consistently associated with childhood abuse, particularly emotional maltreatment (e.g., Kent, Waller, & Dagnan, 1999). Emotional abuse has been defined as, “verbal assaults on a child’s sense of worth or well-being, or any humiliating, demeaning, or threatening behavior directed toward a child by an older person”; whereas emotional neglect refers to, “the failure of caretakers to provide a child’s basic psychological and emotional needs, such as love, encouragement, belonging and support” (Bernstein & Fink, 1998, p.2). Although evidence has shown a relationship between emotional maltreatment and disordered eating, the psychological mechanism by which these are linked has not been established. It has been suggested that emotion regulation is involved in this pathway (Fox & Power, 2009), as evidence has shown a relationship between maltreatment and difficulties in regulating emotions, and between emotion regulation problems and disordered eating. This paper tested this possible pathway by exploring whether emotion regulation mediated the relationship between emotional maltreatment and disordered eating in adolescents.

Studies have revealed disordered eating behavior to be related to a history of sexual abuse (Kong & Bernstein, 2009; Neumark-Sztainer, Story, Hannan, Beuhring, & Resnick, 2000; Wonderlich et al., 2001), physical abuse (Kong & Bernstein, 2009; Mitchell & Mazzeo, 2005; Neumark-Sztainer et al., 2000), physical neglect (Mitchell & Mazzeo, 2005) and emotional abuse (e.g., Kong & Bernstein, 2009). Most research in this area has focussed on the history of sexual and physical abuse rather than emotional abuse and neglect (Hund & Espelage, 2006; Waller, Corstorphine, & Mountford, 2007), though types of abuse often do not occur in isolation and emotional abuse is usually present in all forms of abuse (Kent & Waller, 2000). Studies that have looked at emotional abuse have tended to find a relationship

with disordered eating (Groleau et al., 2012; Hund & Espelage, 2006; Kong & Bernstein, 2009), in some cases reporting it to be the strongest predictor of later disordered eating, relative to other forms of maltreatment (Kent et al., 1999; Witkiewitz & Dodge-Reyome, 2000). An exception to this pattern of findings is a study by Mitchell and Mazzeo (2005), who did not report a significant relationship; however this study used a bulimia specific measure to capture disordered eating behavior in a male population. Those studies finding a significant relationship were with female participants using measures of various disordered eating behaviors, with the exception of Kong and Bernstein's (2009) study with eating disordered individuals of both sexes. This indicates that gender and the type of disordered eating behavior studied might have an influence on findings.

A review of emotional maltreatment and disordered eating concluded that although evidence exists of a relationship between the two, the mechanism by which they are linked remains unclear (Kent & Waller, 2000). One potential mediator of the relationship is emotion regulation. Emotion regulation is defined as a "set of processes by which emotions are themselves regulated...[which] may be automatic or controlled, conscious or unconscious" (Gross, 2007, p.8). Emotion regulation is thought to develop through positive early parent-child interaction with a responsive caregiver who can teach the child to label and manage his emotions (Ehring & Quack, 2010), and through interaction with peers in childhood (Ford, 2005). Conversely, an emotionally invalidating environment typical of emotional abuse and neglect, where the child's emotions are ignored or punished, is theorized to lead to difficulties identifying, expressing and managing emotions (Waller et al., 2007). Indeed, evidence has shown a relationship between abuse and difficulties with emotion regulation. In a longitudinal study with maltreated and non-maltreated children, emotion dysregulation was significantly related to neglect and physical/sexual abuse, earlier onset of maltreatment and multiple types of maltreatment (Kim & Cicchetti, 2010). In another study,

maltreated children displayed less adaptive emotion regulation and greater emotion dysregulation than a control sample (Shipman, Schneider, Sims, Swisher, & Edwards, 2007).

Difficulties in emotional functioning in a broader sense are also characteristic of individuals with eating disorders (e.g., Harrison, Sullivan, Tchanturia, & Treasure, 2010). For example, emotion dysregulation predicted disordered eating scores and body dissatisfaction in a male college population (Lavender & Anderson, 2010) and children who indicated a loss of control over eating used significantly more maladaptive emotion regulation strategies for managing anxiety than controls (Czaja, Rief, & Hilbert, 2009). Furthermore, in a female adolescent population, Norwood and colleagues (2011) found that both restrained and emotional eaters reported higher use of expression and suppression of anger in comparison with a control sample. In clinical samples, self-reported emotion dysregulation has been reported to be higher in women with eating disorders than in healthy controls (Harrison, Sullivan, Tchanturia & Treasure, 2009; Harrison et al., 2010). The prevalence of alexithymia in individuals with eating disorders is also indicative of difficulties in emotional functioning. Alexithymia is described as a difficulty in identifying, describing and distinguishing between feelings (Parker, Taylor, & Bagby, 1998) and is reported to be present in up to 77 per cent of anorexia nervosa patients and up to 83 per cent of bulimia nervosa patients (Quinton & Wagner, 2005).

It has been suggested that disordered eating behavior may be in itself a way of managing strong emotions, by “blocking off” (e.g., Corstorphine, 2006) or dissociating from painful cognitions or negative mood (Cooper, Wells, & Todd, 2004). This idea is supported by qualitative research by Serpell and colleagues, who reported patients with anorexia and bulimia to cite avoidance or escape from emotions as positive aspects of their illnesses (Serpell, Treasure, Teasdale, & Sullivan, 1999; Serpell & Treasure, 2002).

Therefore evidence indicates that emotion regulation difficulties are likely to arise from emotional maltreatment and that they are associated with disordered eating - which highlights emotion regulation as possible mediator. Although researchers have highlighted links between emotional maltreatment, emotion functioning and disordered eating (e.g., Fox & Power, 2009; Groleau et al., 2012), only a limited number of studies have tested relationships between all three variables and these have tended to focus on alexithymia. For example, Mazzeo and Espelage (2002) found that early maltreatment was linked to disordered eating indirectly, via alexithymia and depression. Similarly, in a sample of female undergraduate students, childhood emotional abuse and disordered eating were weakly associated, but this was mediated by alexithymia and general distress (Hund & Espelage, 2006). It is recognized that there is a need to move beyond alexithymia in order to achieve a deeper understanding of emotional processing in eating disorders (Gilboa-Schechtman, Avnon, Zubery, & Jeczmierny, 2006). In one recent study, emotion regulation was tested as a mediator of the relationship between childhood physical, sexual and emotional abuse and eating disorder symptoms in a sample of young women in the US (Burns, Fischer, Jackson, & Harding, 2012). The results indicated that emotion regulation deficits account for some of the relationship between emotional abuse and eating disorder symptomatology, but that there was still a direct relationship between the two.

The present study, also aimed to explore the relationships between early emotional maltreatment, emotion regulation and disordered eating behavior and to test whether emotion regulation would mediate the relationship between emotional maltreatment and disordered eating behavior. However, the study differs from and extends previous research in several ways. Whereas Burns and colleagues (2012) explored relationships in a sample of female college students, the present study focused on male and female adolescents. The rationale for looking at adolescents was that research with young people is scarce, although adolescence is

a critical age for the onset of eating disturbance (Lewinsohn, Striegel-Moore, & Seeley, 2000). Males and females were included as there is evidence that males are also affected by eating disturbance following childhood maltreatment (e.g., Mitchell & Mazzeo, 2005). Whereas Burns and colleagues' study focused on emotional abuse, the present study measured both neglect and abuse. Emotional abuse and neglect represent different types of behavior, involving acts of commission and omission respectively (Wright, Crawford, & Del Castillo, 2009), and appear to be distinct, though related, constructs (Baker & Festinger, 2011). Additionally, the current study measured functional and dysfunctional emotion regulation separately. Phillips and Power (2007) recommend that both types of strategy are measured to obtain a comprehensive picture of emotion regulation and a previous study found the development of both to be affected by childhood maltreatment (Shipman et al., 2007). Furthermore, Mulholland (2010) reported that dysfunctional and functional emotion regulation scores were differentially related to emotional abuse and neglect.

Based on previous research, it was hypothesized that there would be significant correlations between early emotional maltreatment, disordered eating behavior and emotion regulation. It was further hypothesized that dysfunctional emotion regulation would mediate the relationship between both emotional abuse and neglect and disordered eating. Therefore, despite differences in sample age and gender, we expected to find similar results to those of Burns and colleagues. Previous research has not tested whether functional emotion regulation is related to disordered eating, but because other authors have supported a distinction between functional and dysfunctional emotion regulation, the relationships between maltreatment, functional emotion regulation and disordered eating were also explored, and a mediating role of functional emotion regulation tested.

Methods

Design

This was a cross-sectional survey study of community-based adolescents using standardized questionnaire measures.

Participants

Participants were 226 secondary school pupils in a rural, state high school in the United Kingdom. Initially 268 young people were invited to take part. Of these, 21 opted out through personal choice, 5 opted out through parental choice, 11 were asked not to take part as they were absent on the day of the study briefing and one was asked not to take part as this individual's parents had not been informed. A further eight people were excluded as they had not completed consent forms ($n=4$) or the questionnaires were incomplete ($n=4$), leaving a sample size of 222. Pupils were aged 14 to 18 years (mean age 15.38 years; $SD= 1.05$). 123 (55.4%) were male and 99 (44.6%) were female. Height and weight were reported by 120 participants (54.1%) from which Body Mass Index (BMI) could be calculated. The majority of participants (78.3%) fell in the normal weight range, 12.5% in the overweight range, 6.7% in the obese range and 2.5% in the underweight range.

Measures

Participants completed a demographics questionnaire asking them to report their gender, age, and height and weight (if known), and the following measures.

Emotion regulation. Emotion regulation was assessed using the Regulation of Emotions Questionnaire (REQ; Phillips & Power, 2007). This questionnaire measures the tendency to use both functional and dysfunctional emotion regulation strategies, using either internal or

external resources, and is specifically designed for completion by adolescents. Respondents are asked to rate how often they use each strategy on a 5-point Likert scale (Never, Seldom, Often, Very Often, Always). Subsequent to the publication of the 19-item scale, the authors added a further two items to the external functional subscale to improve its internal reliability (personal communication from M. Power); this 21 item version was used in the present study. Mean scores are derived for each of the four emotion regulation strategy types: internal functional (5 items; e.g., “I review (rethink) my goals or plans”), external functional (6 items; e.g., “I talk to someone about how I feel”), internal dysfunctional (5 items; e.g., “I harm or punish myself in some way”), and external dysfunctional (5 items; e.g., “I try to make others feel bad (e.g., being rude, ignoring them)”). A higher mean score indicates greater utilisation of emotion regulation strategies on that subscale.

Because two items had been added to the external functional subscale, the factor structure and reliability of this scale was examined more closely. Principal components analysis showed that two of the original items did not load well onto the factor (“I seek physical contact from friends/family” and “I do something energetic”). Further analysis revealed that these two items were not well correlated with the other items on the subscale and that the internal reliability would be improved by their exclusion, therefore the external functional emotion regulation score was based on four items, two from the original scale and two new items (“I telephone friends or family”, and “I go out and do something nice”). Following this, Cronbach’s alpha coefficients for the current study were .68, .69, .70 and .81 for internal functional, external functional, internal dysfunctional and external dysfunctional strategies respectively. In order to obtain measures of functional and dysfunctional emotion regulation, external dysfunctional and internal dysfunctional scales were collapsed into one dysfunctional emotion regulation scale, by taking the mean of all these items. The same process was conducted for the two functional emotion regulation subscales, using the adapted

four-item external functional scale, as described above. Cronbach's alpha values were .75 for functional and .81 for dysfunctional emotion regulation.

Emotional abuse and neglect. Emotional abuse and neglect were measured using the Emotional Abuse and Emotional Neglect subscales of the Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998). The CTQ is a 28-item self-report measure that screens for a history of childhood abuse and neglect. It is suitable for use with adolescents aged 12 and above and its brevity and ease of use promotes it as a clinical and research tool (Bernstein et al., 2003). The measure covers five types of maltreatment: physical, sexual and emotional abuse, and physical and emotional neglect. For the purposes of the present study, only the emotional abuse and emotional neglect components of the questionnaire were included, with five items in each. Responses are indicated on a 5-point Likert scale, ranging from 1 (*Never True*) to 5 (*Very Often True*). Example items are, "People in my family said hurtful or insulting things to me" (Emotional Abuse scale) and "I felt loved" (Emotional Neglect scale, reverse-scored). Subscales can either be totalled to provide continuous scores or cut off scores to quantify extent of maltreatment can be applied (Bernstein & Fink, 1998). In the present study, continuous scores were used in all analyses. The CTQ is a valid and reliable measure appropriate for use with a community sample (Paivio & Cramer, 2004; Scher, Stein, Asmundson, McCreary, & Forde, 2001). Cronbach's alpha coefficients in the current study were .86 for emotional abuse and .72 (emotional neglect).

Disordered eating. Disordered eating was measured by the Eating Attitudes Test (EAT-26; Garner, Olmsted, Bohr, & Garfinkel, 1982). The EAT-26 is the most widely cited standardized measure of screening for symptoms indicative of eating disorders (McEwen & Flouri, 2009). Participants indicate how true each of 26 statements is for them, on a 6-point

Likert scale, where “Always” is scored as 3, “Usually” as 2, “Often” as 1, and “Sometimes”, “Rarely”, or “Never” as 0. The scale items are summed to provide a total test score, or subscale scores on a Dieting Scale (13 items; e.g., “Feel uncomfortable after eating sweets”); Bulimia and Food Preoccupation Scale (6 items; “Find myself preoccupied with food”), and an Oral Control Scale (7 items; e.g., “Avoid eating when I am hungry”). In the present study, the total score was used. A total test score of 20 or above is indicative of an individual being at risk of an eating disorder. Introductory questions and the behavioral section of the questionnaire were not included, as the questions were considered intrusive for the age group and of no added relevance for the purposes of the study (c.f. McEwen & Flouri, 2009). The EAT-26 is reported to have high internal consistency and test-retest reliability (Garner et al., 1982). Cronbach’s alpha coefficient in the current study was .91 for the total score.

Ethics

The study was approved by the School of Health in Social Science, University of Edinburgh. Consent from the Local Education Authority (LEA) was then sought and the lead researcher was given formal permission for the research to take place within the local authority area.

Procedure

The first author met with a senior member of staff at a high school to explain the research aims. Permission was granted to invite all 3rd to 6th year pupils (ages 13 to 18) to take part. The first author attended two personal and social education classes in consecutive weeks. In the first week pupils were informed about the study, given an opportunity to ask questions and participant information sheets and opt-out consent forms were distributed, for pupils to take home to parents/guardians. The researcher asked the pupils to read the

information sheet over the following week, to show the consent form to their parents/guardians and decide whether they would like to take part. In the second session, the researcher reiterated the procedure and emphasized the voluntary nature of the research before distributing questionnaires. Teaching staff made the researcher aware of any pupils whose parents had opted out of the study. Any pupils who had been absent the week before (missing the research brief) or who made it known they had forgotten to inform their parents were informed that they would be unable to take part. This adhered to the British Psychological Society guidelines that parents/guardians of school children under 18 years should be informed of research and given the opportunity to opt-out if they wish (BPS, 2004). All participants provided written consent to taking part.

Data screening

All analyses were conducted using SPSS version 19. Missing data analysis showed that 28 cases had missing scores for individual items. Little's Test indicated that data were missing completely at random (MCAR). As data were MCAR and only a small number of cases had missing items, case mean substitution was used to replace missing values, which is appropriate for self-report measures (Fox-Wasylyshyn & El-Masri, 2005). Data were significantly positively skewed across all measures except the functional emotion regulation scale. Log transformations improved the normality of distributions and therefore were used in all inferential analyses. However, descriptive data are provided for untransformed data, for ease of interpretation.

Data analysis

Gender differences in scores and relationships between measures were examined using independent t-tests and Pearson's product-moment correlation coefficients. Multiple

mediation analyses were conducted using “Mediate”, a PASW macro (Hayes & Preacher, in press; downloadable from: <http://afhayes.com/spss-sas-and-mplus-macros-and-code.html>). This macro is based on ordinary least squares regression and allows the researcher to examine the direct and indirect effects of one or more independent variable(s) on a dependent variable through one or more mediators, using the product of coefficients for the mediation effect and bootstrap confidence intervals. The present study tested indirect effects of maltreatment (emotional abuse and emotional neglect) on the EAT-total score, using dysfunctional and functional emotion regulation scores as mediator variables, and bias corrected percentile bootstrap confidence intervals based on 5,000 samples (see Fig. 1). Indirect effects were explored where the independent variable was significantly associated with a mediator variable and the mediator significantly associated with the dependent variable; however a significant relationship between the independent variable and dependent variable was not a prerequisite (c.f. Preacher & Hayes, 2008).

<Fig. 1. about here>

Results

Prevalence of emotional maltreatment and disordered eating

Table 1 shows the scores on all scales for males, females, and the whole sample. Participants were considered to display a history of emotional maltreatment if they scored within either of the top two categories of the childhood trauma scale subscales (within the moderate-severe or severe-extreme range). Twenty four participants (10.8%) fell within these ranges for emotional abuse, and 45 participants (20.3%) for emotional neglect. These means are very similar to those found in community samples and prevalence rates broadly

consistent (Baker & Maiorino, 2010), though the rate of emotional abuse was somewhat lower in the present sample. The rates were also similar to those in a previous study in a Canadian high school sample (Wolfe, Scott, Wekerle, & Pittman, 2001) although Wolfe and colleagues found higher rates of abuse than neglect. There was a reasonably high level of co-occurrence of abuse and neglect: of the 24 participants whose scores indicated history of emotional abuse, 14 had a history of emotional neglect indicated. Therefore, 31.1% of those with history of emotional neglect also had history of emotional abuse indicated, and 58.3% of those with history of emotional abuse had scores suggesting a history of emotional neglect. Using the recommended score of ≥ 20 on the EAT-26, the scores of 17 participants (7.7%) were indicative of them being at risk of an eating disorder.

<Insert Table 1 about here>

Gender differences in scores across measures

For comparisons of scores between males and females, log transformed data were used. Childhood emotional maltreatment scores did not differ significantly between males and females ($t(220)=1.14, p=.25$ for emotional abuse; $t(220)=.18, p=.86$ for emotional neglect). Males and females did not differ in the use of dysfunctional emotion regulation strategies ($t(220)=.63, p=.53$). Females scored more highly on the use of functional emotion regulation strategies, though this difference was not quite at a significant level ($t(220)=1.93, p=.06$). Females scored more highly on EAT-26 total score ($t(220)=4.60, p<.001$).

Correlations between emotional maltreatment, emotion regulation and disordered eating

Pearson correlation coefficients using log transformed scores are reported in Table 2. Emotional abuse and emotional neglect were both significantly positively correlated with

EAT-26 total scores (both $p<.001$). Emotional abuse and emotional neglect were both significantly positively correlated with dysfunctional emotion regulation and negatively correlated with functional emotion regulation (all $p<.001$). Dysfunctional emotion regulation was correlated with the disordered eating score ($p<.001$) but functional emotion regulation was not ($p=.82$). A medium sized correlation between emotional abuse and emotional neglect supported the decision to treat these as separate constructs in the subsequent analysis.

<Insert Table 2 about here>

Emotion regulation as a mediator of the relationship between maltreatment and disordered eating

To test whether emotion regulation mediated the relationship between emotional maltreatment and disordered eating, analyses were carried out using the Mediate macro, with disordered eating (EAT-26 total score) as the outcome variable, emotional neglect and abuse as separate independent variables, and both functional and dysfunctional emotion regulation scores as mediators. Transformed scores were used within this analysis. As males and females differed in disordered eating scores, gender was added as a covariate. The output from the mediation analysis is presented in the following order in the text and in Table 3: each emotion regulation score was regressed onto emotional abuse, neglect and gender (i.e., to test pathways from the independent variables to mediators) then the disordered eating score was regressed onto emotion regulation and emotional abuse, neglect, and gender (i.e., to test the pathway from independent variables and mediators to dependent variable). Confidence intervals for indirect effects were then examined to determine whether these effects were significant.

The first part of Table 3 shows that functional emotion regulation was predicted by gender and emotional neglect, such that being female was associated with higher levels of functional emotion regulation and scoring more highly on neglect was associated with lower functional emotion regulation scores. Emotional abuse did not predict functional emotion regulation. The second part of Table 3 shows that dysfunctional emotion regulation was predicted only by emotional abuse, where higher abuse scores were associated with greater dysfunctional emotion regulation scores. The third section of Table 3 shows the coefficients for disordered eating scores regressed onto emotional abuse and neglect, functional and dysfunctional emotion regulation, and gender. Within this model, dysfunctional emotion regulation, emotional abuse and gender were significant predictors, where higher levels of disordered eating were associated with being female and greater levels of abuse, and dysfunctional emotion regulation. This model for predicting disordered eating was significant ($F(5,216)=19.48, p<.001$), accounting for 31.1% of the variance in disordered eating scores.

Table 4 shows the bias accelerated bootstrap confidence intervals for the indirect effects from emotional abuse and neglect to disordered eating through functional and dysfunctional emotion regulation. The only confidence intervals not including a zero value were for the indirect effect from emotional abuse to disordered eating through dysfunctional emotion regulation. Because emotional abuse was still accounting for a significant amount of variance in disordered eating when disordered eating was regressed onto emotional maltreatment and emotion regulation (Table 3), it was concluded that dysfunctional emotion regulation did not account for all the variance in the relationship between the two variables.

< Tables 3 and 4 about here >

Discussion

Summary of findings

The aim of the present study was to test whether emotion regulation mediated the relationship between emotional maltreatment and disordered eating. Unlike previous research, the present study measured both emotional abuse and neglect, functional and dysfunctional emotion regulation, and tested the relationships in an adolescent sample. Both emotional abuse and neglect were significantly associated with disordered eating in a correlation analysis, but a regression model showed only emotional abuse, gender, and dysfunctional emotion regulation to be significant predictors. Mediation analysis further revealed that there was an indirect effect of emotional abuse on disordered eating through dysfunctional emotion regulation.

A large body of literature has already shown a relationship between emotional abuse and disordered eating behavior. However, much of this previous research was conducted with adults (e.g., Kent et al., 1999; Witkiewitz & Dodge-Reyome, 2000) or young people and adults with a clinical eating disorder (e.g., Kong & Bernstein, 2009) rather than with a general population of adolescents. Emotion regulation has been hypothesized to mediate this relationship (Groleau et al., 2012), but only one previous study could be identified that had tested this possibility (Burns et al., 2012), reporting that dysfunctional emotion regulation was a partial mediator of the relationship between emotional abuse and eating disorder symptoms in female undergraduate students. The present findings were therefore consistent with those of Burns and colleagues, despite some differences in the methodologies: the two studies employed different measures of disordered eating and emotion regulation, and the current study was conducted with high school students of both sexes.

The current findings make sense from a theoretical perspective but also suggest areas for further exploration. Morris, Silk, Steinberg, Myers, and Robinson (2007) proposed that emotion regulation development is shaped through social learning, parental practices around emotion and managing emotional reactions, parenting style, and the attachment relationship. Emotional maltreatment, where emotions may be ignored or invalidated, may cause difficulties in identifying, expressing and managing emotions (Waller et al., 2007). Therefore it is unsurprising that the present study found a relationship between emotional maltreatment and emotion regulation.

However, the separation of functional and dysfunctional emotion regulation in the present study revealed that dysfunctional emotion regulation was predicted by greater levels of emotional abuse, whereas lower levels of functional emotion regulation were predicted by greater emotional neglect. This pattern of results fits with those of Mulholland (2010), who also reported that emotional neglect was associated with reduced scores on functional emotion regulation, and that emotional abuse was related to increased use of dysfunctional emotion regulation strategies in high school adolescents. Mulholland argued that the emotional neglect of a child may lead to problems with developing any way of identifying or regulating emotions, through a lack of interaction with, or behavior modelling by, the caregiver. Emotional abuse however may give rise to the development of dysfunctional emotion regulation strategies through the child's attempt to avoid attention and "adapt" to an abusive environment. In support of this idea, Frewen and colleagues reported that emotional neglect, but not emotional abuse, was related to alexithymia in a sample of individuals with post-traumatic stress disorder (Frewen et al., 2008). There was little literature to explain why dysfunctional emotion regulation, rather than a lack of functional emotion regulation, would be related to disordered eating, though some authors have argued that disordered eating is a form of dysfunctional emotion regulation (Corstorphine, 2006; Heatherton & Baumeister,

1991; Serpell & Treasure, 2002); therefore there may be some overlap between the outcome variable and the mediator. The consistency in findings between Mulholland (2010) and the present study suggest that the difference between abuse and neglect in relation to emotion regulation and disordered eating could certainly be investigated further. Because previous research has also indicated that emotional abuse is more strongly related to disordered eating than emotional neglect (e.g., King & Bernstein, 2009), one explanation is that dysfunctional emotion regulation as a result of emotional abuse is more likely to lead to disordered eating than a lack of functional ways to regulate emotions.

Clinical and research implications

Researchers and practitioners acknowledge a need for effective intervention, with young people in particular, to prevent disordered eating behavior from further developing (Ricciardelli & McCabe, 2001). Although dysfunctional emotion regulation did not account for all of the relationship between emotional abuse and disordered eating, emotion regulation is an amenable target for intervention. In a clinical setting, Cognitive Behavioral Therapy (CBT), one of the psychological therapies recommended by National Institute for Clinical Excellence guidelines (NICE, 2004), could be considered an intervention which modifies behavior towards adaptive ways of regulating emotions. However, an alternative approach is Dialectical Behavior Therapy (DBT; Linehan, Armstrong, Suarez, Allmon, & Heard, 1991), which explicitly targets the regulation of emotion through regulation skills teaching. There is evidence to support the use of DBT in treating eating disorders (Bankoff, Karpel, Forbes, & Pantalone, 2012); improving behavioral symptoms of binge eating disorder in adults (Telch, Agras, & Linehan, 2001), and bulimia nervosa and anorexia nervosa in adolescents (Salbach-Andrae, Bohnekamp, Pfeiffer, Lehmkuhl, & Miller, 2008). So far research has not been able to establish whether the effects of DBT occur through improvements in emotion regulation

and DBT has not been directly compared with other forms of treatment (Bankoff et al., 2012), though it may be that CBT or DBT is better indicated as a treatment depending on the individual's presentations of disordered eating (Telch et al., 2001). Some studies have shown potential for psycho-education in emotion regulation as a potentially effective treatment for eating disturbances. Clyne and Blampied (2004) reported positive findings with women with binge eating disorder, following an intervention teaching them emotional awareness and regulation techniques to manage their condition more effectively. Given the relationship between emotion regulation and disordered eating in the present sample, it would be of potential benefit to adapt and test the effectiveness of these techniques in non-clinical settings, such as schools, for an adolescent or pre-adolescent population.

The research base is still a long way from understanding why some individuals will turn to eating (or restraint) to manage emotions over other forms of emotion regulation, such as self-harming or abusing substances (Fox & Power, 2009). Furthermore, those with different abuse histories may develop a different type of disordered eating from others, or arrive at it through different mechanisms (Wonderlich et al., 2001). For example, research suggests a stronger association between a history of childhood sexual abuse and bulimia than anorexia (Wonderlich et al., 1997). It would be of interest for future studies to try to elucidate the pathways for these different disorders, which may involve interactions between multiple mediators and other contextual factors.

Emotion is not a unitary construct and a growing area of research has considered the management of specific emotions in eating disorders. In particular, anger, sadness, and shame are implicated (Fox & Power, 2009; Fox et al., 2013; Ioannou & Fox, 2009). Norwood and colleagues (2011) found that subclinical levels of disordered eating were associated with regulation of anger. In the present study, participants were asked questions about their emotion regulation in a general sense. However, future research could look at

early emotional maltreatment, eating behavior, and emotion regulation with respect to strategies for managing specifically named emotions.

Nor so is emotion regulation a unitary construct, and differences in definitions have been highlighted (Cole, Martin, & Dennis, 2004). Within this field there appeared to be reasonable consensus over the meaning, as the studies referred to in the present paper broadly conceptualized emotion regulation as strategies used to modulate emotions. However, there are some notable differences in its measurement. Many studies used self-report measures, often the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) (e.g., Harrison et al., 2009; Harrison et al., 2010; Lavender & Anderson, 2010), though others employed an other-reported emotion regulation measure (Emotion Regulation Checklist; Shields & Cicchetti, 1997) for research with children (e.g., Kim & Cicchetti, 1997; Shipman et al., 2007). Although the DERS is concerned with dysfunctional emotion regulation, it aims to measure emotion awareness, clarity, and ability to engage in goal-directed behavior, as well as use effective regulation strategies. Therefore it differs from the scale used in the present study (REQ; Phillips & Power, 2007), which specifically focuses on strategies. Consequently there are differences between studies in how the construct is measured; and though there is enough consistency between the results of different studies to suggest that emotional functioning is problematic in individuals disordered eating, this may create challenges around identifying which specific facets are affected.

A further issue in relation to measurement of emotion regulation is whether individuals who have difficulties in identifying emotions can accurately self-report how these emotions are managed. There are alternative, more objective measures, such as respiratory sinus arrhythmia (RSA), which measures a change in heart rate variability over the respiratory cycle and provides a measure of parasympathetic activity when exposed to emotional stimuli (Vasilev, Crowell, Beauchaine, Mead, & Gatze-Kopp, 2009). Vasilev and

colleagues (2009) reported corresponding relationships between RSA and self-report emotion regulation in children, indicating that self-report may be an acceptable method for assessing emotion regulation (at least in relation to the DERS, the measure they employed). From a practical perspective, self-report measures provide a convenient and inexpensive way to assess emotion regulation, though using convergent methods to measure the construct affords a greater ability to make inferences about emotion regulation processes and their effectiveness (Cole et al., 2004).

Limitations

A number of limitations of the present study should be acknowledged. The mediational analysis and interpretation are based on the theory that emotional abuse and neglect influence the development of emotion regulation, which in turn promotes the development of disordered eating. However, the data are cross sectional rather than longitudinal and it has been suggested that difficulties with emotion regulation may develop as the disorder worsens, at least at in relation to diagnosed eating disorders (Harrison et al., 2009). In the present study, most of the participants were not reporting clinical levels of disordered eating and difficulties in emotion regulation were present. However, it cannot be said for certain that emotion regulation difficulties preceded the disordered eating and it would be necessary to collect data longitudinally from a young age to address this question. A second limitation is that only emotional neglect and abuse were measured, as these were directly relevant to the study aims. In Burns and colleagues' (2012) study emotional abuse was a stronger predictor of eating disorder symptoms than sexual and physical abuse, though the authors only used the three abuse scales of the CTQ (Bernstein & Fink, 1998). Furthermore, emotional abuse is widely accepted to be an inherent factor in all other forms of abuse and neglect (Kent & Waller, 2000), making it difficult to disentangle the effects of one

type over another. Nevertheless, it would have been advantageous to use all five subscales of the CTQ to try to control for sexual and physical abuse, and physical neglect.

The reliance on self-report questionnaires for data collection carries with it a note of caution, as it relies on participants' accuracy and honesty about their experiences and behavior. It is recognized that emotion regulation in particular can be difficult to measure, as the strategies employed, at times, can be unconscious (Phillips & Power, 2007). It was not considered appropriate, however, to use a more intrusive method of data collection, given the method of recruitment and desired sample size. A further potential source of bias is that 26 of the young people approached opted out of the study or were opted out by their parents. The researchers did not ask the young people to provide a reason for not participating, but it is possible that this group differed in some ways from those who participated; for example those experiencing abuse and neglect or problems with eating behavior may have been less likely to take part. This may then have had an impact on the representativeness of the sample, and reported levels of abuse, neglect, and disordered eating. Height and weight data were not provided by a large portion of the sample. It is not known how many of those not reporting this information simply did not know their height and weight and how many chose not to disclose it; however, the amount of missing data for BMI may give rise to a biased estimate of the average BMI and range reported.

Despite these caveats, the results indicated that emotion regulation is a significant variable in predicting disordered eating and explaining, at least in part, the relationship between abuse and neglect in a sample of adolescents. Emotion regulation strategies and school based interventions may be an appropriate target for reducing levels of disordered eating among adolescents. Future research should test the longitudinal relationship between emotional maltreatment in childhood, emotion regulation, and disordered eating to verify

these conclusions and further elucidate the effect of neglect and abuse on functional and dysfunctional emotion regulation.

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